

WHAT IS CLAIMED IS:

1. A liquid crystal display element, comprising:
a first transparent substrate having a first surface and an opposed second surface, said first surface being provided with a first ultra-violet protective layer;
a second transparent substrate fixedly attached to said first transparent substrate with a predetermined gap therebetween, said second transparent substrate having a first active surface for bonding with said second surface of said first transparent substrate, and a second active surface opposite said first active surface, and wherein said second transparent substrate being provided with a plurality of vias passing between said first active surface and said second active surface to facilitate electrical continuity between said first active surface and said second active surface;
and,
an optical grade adhesive material bonding layer between said first transparent substrate and said second transparent substrate, said optical grade adhesive material bonding layer extending into each one of said plurality of vias in said second transparent substrate.
2. The liquid crystal display element recited in claim 1 wherein standoffs are fixedly arranged on a peripheral edge of said first transparent substrate for forming said predetermined gap between said first transparent substrate and said second transparent substrate.
3. The liquid crystal display element recited in claim 2 wherein said standoffs are bonded with said optical grade adhesive material bonding layer to said peripheral edge of said first transparent substrate.
4. The liquid crystal display element recited in claim 2 wherein said standoffs have a thickness greater than about 0.075 mm.

5. The liquid crystal display element recited in claim 2 wherein said first transparent substrate has a thickness of about 0.500 mm and said standoffs have a thickness of 0.150.

6. The liquid crystal display element recited in claim 4 wherein said plurality of vias in said second transparent substrate are generally circular and have an average diameter of about 0.300 mm.

7. The liquid crystal display element recited in claim 1 wherein said optical grade adhesive material bonding layer extending into each one of said plurality of vias has a predetermined plug height of not more than about 5 microns above said second active surface of said second transparent substrate to not more than about 40 microns below said second active surface of said second transparent substrate.

8. The liquid crystal display element recited in claim 1 wherein said optical grade adhesive material bonding layer comprises materials selected from the group consisting of an epoxy, an acrylic, or an ester.

9. The liquid crystal display element recited in claim 4 wherein said optical grade adhesive material bonding layer has an index of refraction between about 1.5 to about 1.6.

10. The liquid crystal display element recited in claim 4 wherein said optical grade adhesive material bonding layer has a viscosity in the range of about 300 centipoise to about 1000 centipoise.